

IMPACTS OF IMPLEMENTING ALTERNATIVE 2 — NO ACTION

IMPACTS ON NATURAL RESOURCES

Soils

The continued use, maintenance, and management of RNSP roads, trails, parking and picnic areas, buildings, campgrounds and campsites, and utility systems would result in ongoing minor disturbances to soils and topography, such as erosion and soil compaction. More of the parks' roads would remain unpaved with this alternative (Gold Bluff Beach, Cal-Barrel and Howland Hill roads, Tall Trees access road, and Greater Coastal Drive), causing more erosion and dust dispersion than under alternative 4. Foot traffic would continue to cause compaction and soil loss on established and social trails and near visitor and interpretive facilities.

The construction of additional campgrounds, primitive campsites (not accessible by vehicle), and hiking, equestrian, and mountain biking trails could cause some minor soil disturbance such as soil erosion and increased run-off. Minor soil erosion could occur until vegetation is reestablished in areas disturbed by construction activities. Mitigation measures would be implemented to minimize erosion during construction activities.

Alternative 2 (continuation of the current disturbed lands restoration program) would emphasize partial landform restoration on parklands in the lower Redwood Creek basin and would remove 155 miles of roads, with removal of an average of 2 miles per year over a period of 66 years. Restoration treatments with this alternative would take nearly four times longer to complete than alternatives 1 and 4 (17 years) and alternative 3 (16.6 years). Roads that pose the greatest threat to resources would be treated first. Minor roads would receive only limited treatment, primarily near streams.

Overall, there would be a major beneficial impact on the biological and physical functioning of the tributaries of lower Redwood

Creek from the treatments proposed under this alternative; however, it would take much longer to realize these benefits than with the other alternatives, and the risk of resource damage would continue in the interim.

Erosion potential would be reduced at stream crossings and along all intervening major road segments through the restoration of landforms, soils, and hydrologic patterns; ecosystem impacts from untreated minor road segments would continue. Long-term protection of downslope and downstream terrestrial, riparian, and aquatic habitats would occur as buried topsoil is recovered and redistributed on the finished surface, helping to reestablish vegetation along the restored roads. Restoring prelogging topography along the treated roads would improve the visual quality of the basin as roads were removed and the area was recontoured and revegetated. However, minor roads receiving only limited, partial treatment, primarily near streams, would continue to disrupt natural hillslope hydrology, and vegetation would recover more slowly because little topsoil would be returned to the surface.

This alternative would have the same long-term beneficial impacts as alternatives 1 and 4. However over the short term, implementing this alternative would be the least protective of downstream and downslope resources of all of the alternatives because watershed restoration would take the longest time to complete. The failure of road benches or stream crossings before completion of the restoration program would be more likely than with the other alternatives because a large damaging storm causing catastrophic damage to downslope and downstream resources could occur over the long period required for restoration to be completed under this alternative.

This alternative would result in the decommissioning of roads upstream of the national park much more slowly — 227 years to treat 911 miles of roads — than with the other alternatives proposed in this joint plan (alternatives 1 and 4 would take 23 years to

complete, and alternative 3 would take 17 years). This alternative would have a minor beneficial impact on aquatic habitats and alluvial redwood groves along the main stem of Redwood Creek upstream and within the national park due to the slow rate of progress, the downstream attenuation of the benefits, and the risk of the catastrophic damage of a large storm before completion of the work. There is also the possibility that road sections that were not identified as having high erosion potential and that were not treated could fail after treatment was completed.

Conclusion

The ongoing use, maintenance, and management of roads, trails, and facilities would cause minor disturbances to soils, such as soil erosion and soil compaction. Minor short-term increased runoff and soil erosion could occur as a result of the construction of additional trails, campgrounds, and campsites. The watershed restoration program would have a major beneficial impact on downslope and downstream terrestrial, riparian, and aquatic habitats in the tributaries of lower Redwood Creek. There would be greater potential for failure of road benches and stream crossings before completion of the watershed restoration program than with the other alternatives because it would take about four times longer to complete the program. Over the long term, alternative 2 would improve the park resources through the elimination of abandoned major roads; the restoration of landforms, soils, vegetation; and the restoration of surface hydrology along major roads on national park lands. However, minor roads that receive only limited, partial treatment, primarily near streams, would continue to disrupt natural hillslope hydrology, and vegetation would recover more slowly because little topsoil would be returned to the surface.

Upstream of the national park, road decommissioning and erosion prevention treatments would have a minor beneficial impact of helping protect aquatic habitats, alluvial and riparian vegetation, and water quality in and along the main stem of Redwood Creek. However, this alternative is the least protective of the natural resources in Redwood Creek basin over the

short term because the restoration program would take longer to complete than with the other alternatives, increasing the probability of a large storm causing major adverse impacts from road and hillslope failures in the basin.

Cumulative Impacts

Over the long term (decades to centuries), watershed restoration treatments on national parklands in lower Redwood Creek basin and cooperative erosion control activities upstream of the national park would have a major beneficial cumulative impact of reducing soil erosion and sedimentation that have been adversely affecting downstream resources such as wildlife, water quality, vegetation (alluvial redwood groves, riparian vegetation, and hillslope forests and prairies), and aquatic habitats in the tributaries and main stem of Redwood Creek.

Water Quality

Land use activities adjacent to and upstream of the parks' boundaries, such as logging, road construction, and grazing, would continue to have a major adverse impact on the water quality in the parks. Point and nonpoint source pollution from disturbed areas (particularly logging roads) would continue to elevate suspended sediments and turbidity in the parks' streams. Disturbed lands restoration of parklands in Redwood Creek basin would have the beneficial impact of reducing nonpoint source pollution.

Water quality degradation in the lower Redwood Creek valley includes elevated levels of nitrogen and phosphorus from agricultural runoff, increased sediment loads from past and current upstream logging activities, and increased water temperatures and decreased oxygen caused by the removal of riparian vegetation. There are no actions proposed that would eliminate contamination from animal wastes, reestablish riparian vegetation, or remove the levees along the river, so these adverse water quality impacts would continue to occur.

Waste at existing and proposed campgrounds (at state parks, Freshwater Spit, and remote campsites) might have a localized adverse impact on water quality if not disposed of properly. Water quality monitoring at campgrounds in the state parks would ensure that if a water quality problem existed it would be promptly taken care of.

Impacts on water quality caused by private land uses would depend on the level of cooperation between private landowners and RNSP staff and the willingness of other agencies to apply their water resources protection programs.

Conclusion

Land use activities adjacent to and upstream of the parks continue to contribute point and nonpoint source pollution, such as turbidity, into RNSP streams. Water quality in the Redwood Creek valley is locally being adversely affected by ranching and farming activities and past and current upstream timber harvesting. Because no actions are proposed to reduce contamination from animal wastes or to reestablish streamside vegetation in the lower Redwood Creek valley, these minor adverse impacts would continue. Waste at RNSP campgrounds could cause water quality problems if not disposed of properly.

Cumulative Impacts

Water quality would continue to be adversely impacted by the retention of the federal flood control levees and the erosion and sedimentation caused by past and current logging activities. But over the long term (decades to centuries), watershed restoration in Redwood Creek basin would have a moderate beneficial cumulative impact on the water quality in lower Redwood Creek and the estuary.

Floodplains

The adverse impacts of the flood control levees (see description in the issues discussion of alternative 1 under “Watershed Management and Restoration in Redwood Creek Estuary” in the “Alternatives, Including the Proposed

Action” section and in the “Affected Environment” section of this document) would continue, including altering the physical and biological functioning of the Redwood Creek estuary and adversely impacting water circulation in the estuary and sloughs, reducing deepwater pools, decreasing the extent of wetlands and riparian habitat, deteriorating water quality, degrading juvenile rearing and adult holding habitat for fish, and reducing wildlife and invertebrate abundance and diversity in the lower Redwood Creek valley and estuary.

Because the north and south slough channels to the embayment have become filled with sediment and the sloughs are now isolated from the embayment (except where the mouth closes and the water level rises and during extreme high tides), dissolved oxygen has decreased and algal blooms and aquatic vegetation has increased in the sloughs. The reduction of the area of scour of the sandbar at the mouth of the river would continue, as would the lower seepage rates. Also, the decreased extent of tidal influence at the mouth of the river would continue. Maintaining the current levee configuration under this alternative would perpetuate and exacerbate these major adverse impacts on the lower Redwood Creek floodplain and estuary.

The levees would continue to protect farmland, structures, and roads from up to a 100-year frequency flood event.

During summer and fall low-flow periods the embayment closes at the mouth of Redwood Creek, and lands in the estuary are periodically flooded. Flooding can prevent the use of farm equipment, adversely affect growth of crops in the fields, prohibit use of the fields by farm animals, and periodically restrict access to private properties on Hufford Road. Woody debris left in the fields after waters recede can also interfere with cultivation and mowing. Up to 95 acres of agricultural land and portions of Hufford Road could continue to be flooded occasionally during the summer and fall when the sand berm closes the mouth of Redwood Creek. Natural or human-induced uncontrolled breaching of the berm to protect properties from flooding might also still occur without a permit

TABLE 26: SUMMARY OF MANAGEMENT ACTIONS IN LOWER REDWOOD CREEK AND THEIR IMPACTS ON RIVER MORPHOLOGY, FLOODPLAINS AND THE ESTUARY UNDER ALTERNATIVE 2 (NO-ACTION) AND ALTERNATIVE 4

Management Action	Impact
Maintain current extent and configuration of levees along lower Redwood Creek	Would continue major adverse impacts on water circulation and sedimentation patterns (increased sediment deposition in estuary and sloughs, eroded channel, steeper channel gradient, higher stream velocity) and degraded water quality. Beneficial impact of protecting agricultural lands, structures, and roads from winter flooding.
Channel manipulation to protect the Redwood Information Center	Would interfere with natural fluvial processes such as river migration; would ensure that Redwood Information Center would not be destroyed by river migration.
Dredge north and south sloughs	Aggradation and overwash of the sloughs would continue to occur. Turbidity would be temporarily increased. Without partial levee removal, dredging would only be short-term solution because over time the estuary would fill in with sediment.
Elevate Hufford Road	Would ensure access for property owners, eliminate .09 acre of wetland/floodplain, and reduce the likelihood that artificial breaching of sandberm would occur to ensure landowner access.
Watershed restoration activities (disturbed lands restoration throughout parklands in Redwood Creek basin to be completed in 66 years)	Over the long term, decreased upstream erosion and sediment inputs would reduce downstream streambed migration, aggradation, streambank erosion, channel widening, and increase deepwater pools in the river.

from the Corps and could entrain and kill large numbers of fish in the discharge.

Since the mid 1990s, the park's policy has been to protect salmonid habitat from the adverse effects of an uncontrolled breach. The U.S. Army Corps of Engineers approved a section 404 permit for controlled breaching of the estuary during the summer and fall low-flow periods to protect fish habitat. Controlled breaching by the parks could also prevent the occurrence of an uncontrolled natural breach that could have major adverse impacts on salmonid habitat. As a condition of the section 404 permit, the Corps stated that a longer term alternative should be pursued to manage water levels in the estuary. These measures may include the setback of levees, conservation easements, the raising of the county road above flood elevation, or outright land purchase in the lower Redwood Creek valley to protect the fisheries resource.

As long as Redwood Information Center remains in its current location, channel manipulation might at times be necessary to protect the facility through an approved section 404 permit. There still remains the risk of structural damage and loss of life at the

Redwood Information Center from a large flood, earthquake, or tsunami.

Ongoing disturbed lands restoration would reduce the amount of sediment entering Redwood Creek and its tributaries and would assist in the recovery of stream morphology, and hydrologic and biological processes. The erosion potential at stream crossings in the national park would be eliminated upon completion of the watershed restoration program, even though the downstream benefits from these treatments might take decades to centuries to be fully realized.

Conclusion

The no-action alternative would continue to have a major adverse impact on the extent of natural floodplain and related processes and on biological and physical processes and aquatic resources in the lower Redwood Creek valley and Redwood Creek estuary. Elevating Hufford Road and retaining the levees would have the beneficial impact of protecting private property and current land uses. Dredging the sloughs would temporarily increase turbidity, but over time the estuary would fill in with sediment.

Cumulative Impacts

Downstream cumulative impacts such as siltation and aggradation, increased bank erosion, and channel widening in Redwood Creek basin streams would continue to occur but would decrease as roads, road benches, and stream crossings were treated through erosion prevention treatments over the long term. Watershed restoration would have a moderate beneficial cumulative impact on physical and biological processes in lower Redwood Creek valley and Redwood Creek estuary. Retention of the levees would continue to have a major adverse impact on sedimentation and other hydrologic processes in the lower Redwood Creek valley and estuary.

Wetlands

Impacts from Watershed Restoration

Watershed restoration under this alternative would have long-term benefits for riverine and perennial wetlands in drainages where landforms were restored and roads removed or treated to reduce erosion. The primary difference between this alternative and the proposed action would be the time period over which watershed restoration occurred. There would be fewer short-term benefits for riverine and perennial wetlands under this alternative because fewer miles of roads would be treated annually, thus increasing the chance that untreated roads would fail before restoration could be completed.

A major storm occurring before completion of all watershed restoration treatments would be likely to adversely affect downstream wetlands by sedimentation that would alter drainage patterns and destroy vegetation and wildlife in and adjacent to the stream channel.

Wetlands along the main channel of Redwood Creek would benefit from increased attention to erosion prevention in lands upstream of the national park. Less sediment would move downstream into the national park. Sediment transported downstream fills in riverine and palustrine wetlands, decreasing their overall

size. Wetland functions and values lost to sedimentation include flood attenuation and wildlife habitat. If sediment was transported from upstream of the park into Redwood Creek, it would eventually move down the creek into the estuary, where estuarine functions would be impaired.

Impacts of Estuary Restoration

Under the no-action alternative, there would be no restoration of the estimated 75% of estuarine wetland habitat in the Redwood Creek estuary that has been lost through channelization, draining, diking, and infilling of the estuary and sloughs. Because the flood control levees would not be removed under this alternative, and no wetlands would be restored as a direct result of partial levee removal, reduction in flow and circulation from the levees combined with delivery of high volumes of sediment from industrial activities upstream would continue to reduce the depth of portions of the estuary. The alteration of estuary circulation and flow that began when portions of the estuary were diked and drained for residential and agricultural development and when the flood control levees were constructed in 1968 would continue. These are considered indirect adverse impacts on those areas of the estuary that are defined as wetlands.

Long-term adverse impacts from habitat reduction and alteration of food sources of anadromous salmonids that use the estuary at some stage in their life cycle would continue. Habitat for the tidewater goby would continue to be less than under original estuary configuration and circulation patterns. Occasional severe adverse impacts on fish would result if illegal uncontrolled breaching occurs during the summer. These are indirect adverse impacts on wetlands because fish habitat is one of the major functions and values of the Redwood Creek estuary.

Impacts of Second-Growth Forest Management

There are 7,900 acres of second-growth forest within 300 feet of intermittent and perennial stream channels, none of which would be managed under this alternative. There would be

no direct short-term or long-term adverse impacts on these wetlands from managing this second-growth forest. There would be minor indirect adverse impacts on wetlands from altered vegetation patterns and species composition in the unmanaged second-growth forests upslope of and adjacent to stream channels and drainages.

Impacts Related to Artificial Impoundments

Artificial impoundments at Marshall Pond and Lagoon Creek include shoreline areas that meet both the NPS and Army Corps of Engineer criteria for wetlands. Should an evaluation of physical condition of these dams result in a determination that either dam constitutes a significant threat to public safety or resources, RNSP staff would compare the risk posed by failure of the dam with the beneficial wetland values to determine whether the risk to public safety outweighs the beneficial functions and values of the wetland. If public safety was determined to be the paramount value, and removal of either dam was proposed, replacement of lost equivalent wetlands would be required for mitigation.

Wetland values of Marshall Pond include habitat for fish, amphibians, breeding waterfowl, and other wildlife, and recreational and aesthetic benefit to hikers passing the pond on the Flint Ridge portion of the Coastal Trail. Mitigation for removing Marshall Pond would include restoring and recontouring the natural stream channel, which would continue to provide habitat for amphibians and fish. Removing the dam and restoring a natural stream channel would increase the amount of salmonid spawning habitat in Richardson Creek. This would be an indirect benefit for wetlands from restoring wetland functions of fish and amphibian habitat.

Beneficial wetland values of Lagoon Creek include aesthetics, recreation, and wildlife habitat. These values would be considered, and mitigation to replace these values would be developed should the dam fail or otherwise become a threat to public safety or significant resources.

Impacts Related to Visitor Use

Minor adverse impacts on wetlands would result from construction, use, and maintenance of trails, camping areas, and public roads. There would be fewer impacts from construction, use, and maintenance of camping areas than from trails because more new trails would be constructed than new camping areas.

There would be direct adverse impacts on coastal streams that drain into the ocean at Gold Bluffs Beach if vehicles continue to drive through this area to reach Fern Canyon. These impacts would be anticipated to be short term because winter storms and seasonally high tides, in combination with heavy rainfall and subsequent high creek and stream flows, erase traces of vehicle use. There would be direct, short-term, repeated adverse impacts on about 900 square feet of riverine wetland near the Fern Canyon parking area from annual maintenance and from vehicles driving through the streams on the approach to the parking area. Relocating the parking area would result in the restoration of about 20,000 square feet of wetland.

Retaining the road, parking, and restrooms at Crescent Beach picnic area would result in continued impacts on 0.5 acre of coastal palustrine wetland.

Impacts of Operations (Maintenance)

Road maintenance including culvert replacement and ditch-cleaning would have minor adverse impacts on small wetlands along all public roads and some former logging roads that are being maintained for RNSP administrative access. Long-term adverse impacts on adjacent drainages would continue as sections of roads fail, with subsequent runoff into and sedimentation of stream channels. A major road failure would result in moderate to significant short-term adverse impacts from erosion and runoff, depending on the location of the failure.

Minor long-term adverse impacts into nearby streams from runoff of petroleum products and from road repairs and maintenance would continue on Del Norte Coast Redwoods State

Park entrance road, Cal-Barrel Road, Howland Hill Road, and the Tall Trees access road.

Minor adverse impacts on coastal drainages from erosion and runoff from the unsurfaced portions of the Greater Coastal Drive would continue. The removal of the greater Coastal Drive and reconstruction as a trail would result in short-term adverse impacts on small isolated wetlands and headwater stream channels. Minor impacts from erosion of bare soils following road removal and restoration would continue for one season until revegetation occurred. Long-term beneficial impacts on riverine wetlands in coastal drainages would result from restoring the original landforms and stream channels if the road were removed and rebuilt as a trail.

Conclusions

There would be major long-term benefits for intermittent and perennial stream channels immediately downstream from those areas where original landforms were completely restored. There would be a moderate long-term benefit for stream channels immediately downstream of areas where roads were decommissioned or treated to control erosion. Other downstream wetlands would benefit indirectly from restoring natural drainage patterns and reducing sediment delivered into streams. Untreated sites would continue to fail, delivering sediment into Redwood Creek and thus causing adverse impacts on riverine palustrine wetlands.

The no-action alternative would result in little or no increase in the amount of wetlands associated with the Redwood Creek estuary. Channel dynamics and circulation patterns would continue to be adversely affected by maintaining the configuration and drainage structures of the levees.

About 10 to 15 acres of forested pond and marsh habitat favored by some waterfowl species would be lost with removal of Marshall Pond (5 to 10 acres) and Lagoon Creek (about 5 acres). There is relatively little forested pond habitat in the parks. Open water marsh and pond habitats exist in the coastal lagoons and the Crescent Beach ponds. The coastal lagoons are primarily

open water habitat. The Crescent Beach ponds are preferred by coastal bird species. Birds that use Lagoon Creek are commonly observed in other nearby habitats. Birdwatchers would lose a unique site in the parks with the removal of Marshall Pond, which would be considered an indirect adverse impact on the recreational and aesthetic values of this wetland.

The removal of the dams and the restoration of the stream channels at Marshall Pond and Lagoon Creek would adversely affect waterfowl but would increase habitat for fish.

Cumulative Impacts

The overall cumulative impact on wetlands from all actions under the no-action alternative would be a moderate benefit obtained primarily from watershed restoration in the Redwood Creek basin.

This alternative would have moderate long-term adverse cumulative impacts on the wetlands associated with the estuary because little restoration would occur, but there would be a gradual reduction in sediment delivered from road failures upstream in the Redwood Creek basin within and outside the parks.

Very minor indirect but cumulative long-term negative impacts on wetlands associated with intermittent and perennial stream channels would result from allowing second-growth forests to mature without management or intervention and from limiting fire management primarily to prairies. The cumulative impact results from perpetuating unnatural drainage and vegetation patterns.

There would be minor negative cumulative effects on wetlands adjacent to roads from continued road maintenance and erosion into stream channels.

Threatened and Endangered Species

Impacts of Watershed Restoration

Watershed restoration under this alternative would have a greater potential for adverse

impacts on coho salmon and other anadromous fish than under the proposed action because it would take about four times longer to complete restoration treatments, thus increasing the chance that untreated roads would fail if a major storm occurred. Long-term benefits for coho salmon and other anadromous fish would be the same as under the proposed action provided that important fish-bearing tributaries received the most extensive restoration treatments and were treated first. The benefits to northern spotted owls and marbled murrelets from watershed restoration would be about the same as under the proposed action.

Impacts of Estuary Restoration

Under this alternative, direct adverse impacts on juvenile coho salmon and other anadromous fish, and on tidewater goby habitat from breaching of the sandbar at the Redwood Creek estuary would be minimized to the greatest extent possible by controlling the timing, depth, and location of breaching when trying to prevent the negative effects of a natural uncontrolled breaching event.

The greatest potential for significant direct adverse impacts on coho salmon and other anadromous fish in the Redwood Creek estuary would exist in the summer when juvenile salmonids are present and the berm is breached in an uncontrolled manner to protect private property from flooding. Direct adverse impacts on juvenile salmonids result from fish being entrained in the outflow of estuarine waters into the ocean, where smaller fish are less able to escape predators. The later in the season breaching is performed, the less adverse the impact, because juveniles are larger and have had more time to adjust physiologically for the transition from fresh water to salt water.

Impacts Relating to Artificial Impoundments

There would be minor adverse impacts on coho salmon and other anadromous fish if the dam at Marshall Pond was retained, which would reduce the available spawning habitat in about 1,500 feet of the original stream channel of Richardson Creek. There would be a temporary adverse impacts on coho salmon and other

anadromous fish from catastrophic failure of the Marshall Pond dam. Fish might be forced prematurely into the Klamath River if hydraulic pressure after catastrophic dam failure was great enough to flush the impounded water into the river. The removal of the dam and the restoration of the stream channel to its original contours would directly benefit coho salmon and other anadromous fish.

There is no information on whether the original stream channel at Lagoon Creek was occupied by coho salmon or other anadromous fish. If there was suitable habitat, it was likely occupied by steelhead, coastal cutthroat trout, and coho salmon. A long-term minor benefit to these fish populations would be anticipated if the stream was restored following the removal of the impoundment.

Impacts of Second-Growth Forest Management

Continued indirect long-term adverse impacts on marble murrelet populations would be anticipated from allowing the approximately 45,000 acres of second-growth forests to mature without treatment because suitable nesting habitat would remain limited to the approximately 43,000 acres that now exist in the parks. Fewer indirect long-term adverse impacts would be anticipated on northern spotted owls than on marbled murrelets from allowing second-growth forest to mature without management because owls will nest in younger forests without the habitat characteristics present only in old-growth stands that murrelets prefer for nesting.

Although second-growth forest stands might attain characteristics suitable for nesting for northern spotted owls in as little as 50 to 100 years and marginally suitable for marbled murrelets in 100 to 200 years (Ralph et al. 1995a), estimates of time required for forests to regain old-growth characteristics without treatment or manipulation may be on the order of 500 years (NPS 1975).

It is not known whether some second-growth stands with extremely dense stocking rates, stands of exotic conifers, or even-aged

monocultures would attain suitable characteristics for marbled murrelet nesting in 200 years in the absence of management or intervention. The 200-year estimate is based on forest stands regrowing in the midst of naturally occurring forest that is colonized by murrelets from adjacent forest with mixed species and age classes and appropriate canopy structure. Reattaining forest characteristics required by murrelets for successful nesting, particularly in second-growth stands that are dense monocultures, may require even longer.

Fragmentation of existing forest in the RNSP ecosystem would continue to have moderate indirect long-term adverse effects on owls and murrelets from edge effects that increase the likelihood of nest predators locating owl or murrelet nests in adjacent old-growth forest.

There would be no direct short-term adverse impacts on murrelets or owls from noise and disturbance required to remove selected trees in second-growth forest lands.

Impacts of Prairie Restoration

Prairie restoration in the Bald Hills would result in minor direct short-term adverse impacts on nesting spotted owls and murrelets if smoke from prescribed fires drifted into nesting territories or occupied stands.

The removal of Douglas-fir greater than 18 inches diameter at breast height or greater than 40 years of age for the restoration of Bald Hills prairies might result in minor adverse impacts on northern spotted owls from removing potential nesting habitat. The impact would not be significant because of the amount of better habitat available in the forests adjacent to the prairies. Direct adverse impacts on owls would be avoided through the survey of conifers to be removed. If owls were found to have established territories in or adjacent to the trees, the trees would not be cut.

Adverse impacts on marbled murrelets from drifting smoke and disturbance from prescribed fires would be avoided by conducting these burns outside the restriction period established to protect nesting murrelets or through other

methods authorized through section 7 consultation with the U.S. Fish and Wildlife Service. Adverse impacts on owls would be reduced by complying with the air quality standards set by the regional air quality control board to reduce adverse effects of drifting smoke.

Restoring natural ecological processes including fire would result in indirect long-term benefits for all listed or proposed threatened or endangered species that inhabit RNSP ecosystems.

Impacts Related to Visitor Use

Long-term noise of variable intensity includes noise from highways and from developed areas and temporary noise from the construction of trails and the maintenance of facilities. Trucks braking on steep hills, such as Bald Hills Road near Lady Bird Johnson Grove, make short-term, intense noise repeated several times daily. Moderate-term noise would include RNSP resource management actions, including watershed restoration and second-growth forest management. Noise impacts could be mitigated by (1) conducting activities outside the breeding season, (2) by restricting the noise to very short periods in the middle of the day, (3) by surveying for the presence of birds and not conducting management activities if nesting birds were present, or by (4) other methods authorized through section 7 consultation with the U.S. Fish and Wildlife Service.

Impacts on marbled murrelets, northern spotted owls, and snowy plover habitat that result from campgrounds accessible by vehicles include noise from people, vehicles, and generators; garbage generation, which attracts nest predators and may contribute to an increase in abundance and distribution over naturally occurring levels of these predators; and the development of support infrastructure, including roads and utilities, with increased maintenance required.

There would be minor, temporary adverse impacts on marbled murrelets and northern spotted owls from noise and disturbance in old-growth campgrounds in the three state parks. These impacts have occurred for many years. The breeding season for both birds begins one to

two months before the heavy visitor use season. Birds that initiated nesting before increased visitor use of the campgrounds could be disturbed as noise and use increases. This is not considered likely because there is minor noise and disturbance from visitor, maintenance, or residential use of the campgrounds year-round.

The construction of more campsites in vehicle-accessible campgrounds would increase visitor use in old-growth redwood and Douglas-fir forest in Jedediah Smith Redwoods State Park; in old-growth redwood, prairie, and riparian forest in Elk Prairie campground in Prairie Creek Redwoods State Park; in red alder riparian forest in Mill Creek campground in Del Norte Coast Redwoods State Park; and in coastal dune habitat in Gold Bluffs Beach campground in Prairie Creek Redwoods State Park. Adverse impacts on northern spotted owls and marbled murrelets would be minimized by selecting sites in habitats least suitable to these species in the forest campgrounds. The construction of new campsites in existing old-growth campgrounds would have a minor, incremental effect on the birds from slight increases in noise and disturbance during the high visitor use season. The construction of more campsites at Gold Bluffs Beach would not be anticipated to result in new adverse impacts on snowy plover habitat because the amount of human use in the immediate vicinity of the campground makes it generally unsuitable for plover nesting.

The construction of new campsites in the forest campgrounds would constitute an adverse impact on marbled murrelets, marbled murrelet critical habitat, and northern spotted owls; but the amount of habitat affected would be very small and is already affected by ongoing use of the campgrounds. Acreages of suitable murrelet and owl nesting habitat within each campground and associated developed area, and within 0.25 mile of each campground and developed area, are approximately 83 and 431 acres at Jedediah Smith and 37 and 326 acres at Elk Prairie campground, respectively. At Mill Creek campground there are about 62 acres of development within suitable owl nesting habitat and 493 acres of spotted owl nesting habitat would be affected. There is no development in suitable murrelet

nesting habitat, but about 14 acres of suitable murrelet nesting habitat within 0.25 mile of the campground would be affected by maintenance activities. At Gold Bluffs Beach campground, there are about 80 acres of suitable murrelet and owl nesting habitat within 0.25 mile that might be affected by noise.

The overall level of development and use is significantly lower in primitive camping areas compared to drive-in campgrounds. There are no primitive camps that have been developed in suitable northern spotted owl or marbled murrelet nesting habitat. The number of acres of suitable owl and murrelet nesting habitat within the parks that would be affected by maintenance of primitive camps, and therefore subject to noise effects, would be about 1.2 acres at DeMartin; 8 acres at Flint Ridge; 37 acres at Butler Creek; 79 acres at Miner's Ridge; 33 acres at Forty-four Creek; and 101 acres at Elam Creek.

Trails and roads are linear features that create noise and disturbance within a narrow corridor. Currently, 54% of old-growth forest (22,540 acres) in the parks is within 0.25 mile of trails. The construction of the East Side Trail along the east side of the Redwood Creek basin between Highway 101 and the Tall Trees Grove, plus the Skunk Cabbage Groves Trail on the hill southwest of Davison Ranch, would result in 60% of old-growth (24,530 acres) being located within 0.25 mile of trails. The construction of all trails included in approved RNSP planning documents would result in 69% of old growth (28,200 acres) being within 0.25 mile of a trail.

There would be minor to moderate repeated adverse impacts from continuing noise and disturbance from vehicles on Highways 101, 199, and 197, the Newton B. Drury Scenic Parkway, Bald Hills Road, Cal-Barrel, Howland Hill, and Coastal Drive Roads that pass through old-growth forests. The use of most RNSP roads in old-growth forest other than the major highways is occasional and short term and would result in minor adverse impacts.

Conclusion

Watershed restoration in the Redwood Creek basin under the no-action alternative would have

a moderate positive long-term effect on coho salmon and other anadromous fish spawning habitat and indirect minor positive impact on tidewater goby habitat downstream in the Redwood Creek estuary.

Implementing this alternative would result in a continuing major direct adverse impact on tidewater goby habitat and a moderate adverse impact on coho salmon and other anadromous fish occupying the Redwood Creek estuary from habitat destruction and the channel alteration due to levees, along with continued sedimentation from upstream land uses outside the national park.

Breaching of the sandberm at the Redwood Creek estuary results in a minor indirect adverse impact on snowy plovers from a decrease in available nesting habitat.

Impacts from visitor use of the parks, including recreational use of roads, trails, and campgrounds, would affect primarily northern spotted owls and marbled murrelets occupying old-growth forests. There would be minor indirect adverse impacts on snowy plovers from visitor use of sandy beaches that constitute their nesting habitat. Visitor-related impacts would be minor to moderate, depending on the season. There would be moderate adverse impacts from visitor use from noise and disturbance during the nesting season in those areas known to be occupied by owls or murrelets.

There would be very minor adverse impacts on marbled murrelets and northern spotted owls from the removal of hazard trees in campgrounds because neither owls nor murrelets are known to occupy trees in campgrounds in old-growth habitat. Any impact from hazard tree removal would be a minor cumulative impact from removing potential nesting habitat.

The primary adverse impacts on owls and murrelets from RNSP operations under the no-action alternative would result from the construction and maintenance of visitor and administrative facilities in old-growth forests. Most new construction is anticipated to be for new trails. These impacts would range from

minor to moderate, depending on the specific location and timing of the construction and maintenance required.

Cumulative Impacts on Threatened and Endangered Species

The overall cumulative impact on threatened and endangered species under the no-action alternative would be anticipated to be a moderate positive long-term benefit, obtained primarily from watershed restoration.

Continuation of the current management of the Redwood Creek estuary would have minor cumulative adverse impacts on tidewater goby habitat.

Allowing second-growth forests to mature without management or intervention would slow reattainment of old-growth habitat characteristics in these forests, thus delaying the suitability of these second-growth forests for murrelet and owl nesting. Forest fragmentation would be reduced with or without treatment, but it might take as long as 500 years without management. The reduction of fragmentation would be a moderate, very long-term cumulative benefit for marbled murrelets and northern spotted owls.

The removal of abandoned logging roads and subsequent landscape restoration would result in a long-term benefit for marbled murrelets and northern spotted owls because restoration would decrease fragmentation of forests. About 60 miles of trail would be constructed throughout the Redwood Creek basin, increasing human activity that can attract predators of the bird nestlings. There would be a net gain of habitat within the parks from decreased fragmentation of forest from regrowth following watershed restoration.

Visitor use of the parks, including recreational uses and RNSP operations (construction and use of facilities and all maintenance activities in the parks) would have moderate cumulative adverse impacts on threatened and endangered species.

The retention of dams and impounded water would have minor adverse cumulative impacts

on coho salmon and other anadromous fish populations. The removal of the dams and the restoration of stream channels would have minor cumulative benefits for coho salmon and other anadromous fish populations.

Continuing the prescribed fire program would have a positive cumulative effect on threatened and endangered species.

IMPACTS ON CULTURAL RESOURCES

New facilities (trails and state park campgrounds) would be sited to avoid adversely impacting known cultural resources. Hiking, equestrian, and mountain bike trails and campsites would not be removed from sensitive resource areas. Sensitive cultural resources would continue to be susceptible to damage from visitor use.

Implementing the no-action alternative would not improve the RNSP curatorial program. The parks' collection storage would continue to be inadequate, minimal resources would be available for processing archival materials, and computer-based access to the collections would be minimal.

Conclusion

The no-action alternative would provide the least integrated and balanced approach to the parks' management of cultural resources, visitor use, and interpretation. Adverse impacts on cultural resources could result from constructing a primary visitor center outside of the parks, the continued susceptibility of sensitive resources to visitor use, and the inadequacy of the parks' curatorial program.

Cumulative Impacts

Cumulative impacts would result from the continued visitor use of campsites and hiking, equestrian, and mountain bike trails in the vicinity of sensitive cultural resources, as well as inadequate storage for the parks' collections. It is possible that cultural resources outside of

RNSP boundaries have been destroyed or damaged in the past by either nonfederal or nonstate actions. Most actions proposed in this joint plan fall under the auspices of federal preservation laws, as well as the California Environmental Quality Act, which provide legal protection for cultural resources. However, actions occurring outside of the parks' boundaries, such as watershed restoration or the construction of a nonfederally funded visitor center, could adversely impact cultural resources not afforded the protection of federal or state law.

Cumulatively, cultural resources would benefit from continued partnerships with American Indian tribes and preservation groups, as well as the assistance that could be provided to protect cultural resources affected by actions occurring outside of the parks' boundaries, such as watershed restoration and the construction of a nonfederally funded visitor center.

IMPACTS ON VISUAL QUALITY

Due to the inherent visual sensitivity of landforms and land cover within this region, watershed restoration actions under this alternative could result in appreciable impacts on visual resources. These impacts would be most visible on forested and open hillsides as well as open flat areas. Disturbed lands restoration activities altering terrain or vegetation could impact the line, form, color, texture, and visual density of the landscape. Impacts would affect visual experiences in both micro and macro landscapes. The watershed restoration activities specified in this alternative would have primarily short-term negative visual impacts ultimately resulting in long-term benefits. The potential failure of partially treated roads would create unnatural openings. The road benches would remain as visual scars on a macro and micro landscape level. As surrounding second-growth forest matures, the physical delineations of the remaining roads might become increasingly visible through the forest. This impact would be most apparent from overlooks along the Bald Hills Road and from the 101 Bypass.

Within visually sensitive areas, management actions intended to remove recent signs of human occupation and to restore historic prairie fire regimes could result in short-term negative visual impacts that could affect large viewing areas. Overall, visual quality would greatly depend on project-specific visual analysis and treatment recommended.

Retaining access roads, parking areas, trails, and associated facilities in visually sensitive areas could result in long-term negative visual impacts affecting both micro and macro landscape experiences. Providing additional hiking, equestrian, and mountain biking trails as well as camping facilities would have a beneficial impact on long-term landscape viewing experiences. Maintaining existing pullouts, waysides, and views would provide no appreciable increase in macro landscape viewing opportunities. Overall visual quality would greatly depend on project-specific visual analysis of all actions resulting in the removal, relocation, or installation of visitor use and interpretive facilities.

Coastlines and coastal environments are highly sensitive visual resources due to intensive dynamic contrasts and extensive viewsheds. Extensive overnight vehicle camping activities along this highway corridor and adjacent beachfront at Freshwater Spit result in overwhelming visual contrasts that strongly impact the indigenous landscape character. Limiting overnight vehicle camping to a single row along the highway, allowing tent camping on the south end of the beach, and providing portable toilets at several points along the beachfront would continue to result in major negative visual impacts affecting much of the area's natural character.

Acquisition related to viewshed protection and lands with significant scenic value would greatly enhance the preservation of regional landscape character. Identifying and protecting visual/scenic resources along highway corridors and roads could result in substantial long-term visual benefits. Negative visual impacts resulting from new road development or road maintenance activities should be relatively minor in this alternative.

Conclusion

Under this alternative there would be moderate negative impacts on visual and scenic resources. Most long-term negative impacts would be associated with maintaining current visitor impact levels, retaining facilities in visually sensitive areas, and allowing restricted vehicle camping in coastline areas. Other negative impacts would be short term and ultimately would result in long-term visual benefits. Overall visual and scenic quality would directly depend on project-specific visual analysis studies and design implementation. Harvested areas in Redwood Creek basin would be restored first and over time, the lower basin would become more aesthetically pleasing and have a more natural appearance for park visitors. Revegetation of the area would occur soon after restoration activities were completed, but restoration of the visual appearance of an old-growth redwood forest would take decades or more to occur, a minor beneficial impact. Viewshed protection actions would enhance landscape character and result in major long-term visual and scenic benefits.

Cumulative Impacts

Cumulative visual and scenic impacts would include those previously occurring within and surrounding RNSP properties as well as those identified under this alternative. Previous land use activities have impacted the indigenous visual character of virtually all landscape units. The major cumulative visual impacts of the extensive timber harvesting, road and highway alignments, and other development activities would remain highly visible throughout the region. Under this alternative maintaining current visitor impact levels, retaining facilities in visually sensitive areas, and allowing restricted vehicle camping in coastline areas would have a major cumulative long-term negative impact on visual and scenic resources. Watershed restoration activities and viewshed protection actions would have a cumulative long-term beneficial impact on visual and scenic resources.

IMPACTS ON VISITOR ACCESS AND CIRCULATION

Not repairing the Coastal Drive and making it a trail if the road failed would eliminate vehicle access to portions of the coast south of the Klamath River and connections to Newton B. Drury Scenic Parkway and would eliminate one access to Alder Camp.

There would be no new developments proposed under existing plans, and the maintenance of the orientation/information centers would result in no new impacts in circulation on the highways or road system.

IMPACTS ON THE QUALITY OF THE VISITOR EXPERIENCE

Visitor Use Opportunities

Under this alternative visitors would benefit from an increase in visitor use facilities and opportunities as current management plans — the *State Redwoods Parks General Plan* and the 1984 *Redwood National Park Backcountry Trails Plan* — were implemented. Additional campsites in the state parks' campgrounds would mean more camping opportunities within the parks during the summer when these campgrounds operate at capacity. The greater density of campers during peak season would mean increased noise and competition for campground facilities, and greater demand and stress on activity sites in or adjacent to the campgrounds. Visitors seeking a more primitive camping experience would benefit from the small increase in the number of primitive campsites in the parks.

The additional trails constructed under this alternative would provide more recreational hiking and biking opportunities. These trails would increase the range of trail opportunities and the number of resource areas available for visitors to experience and enjoy. Increasing the number of trails might tend to disperse trail use and visitor impacts on any given trail.

There would be no change in the visitor use opportunities and visitor experience of Freshwater Spit, where recreational vehicle campers would continue to be limited to a single row along the shoulder of U.S. Highway 101 and tent camping would continue to be allowed on the south end of the beach.

Visitors would no longer be able to drive their vehicles on Freshwater Spit or Crescent Beach. The positive benefit of this action would be that beach users would see and have to deal with fewer vehicles on those beaches (commercial fishermen would still be allowed vehicular access to the beaches). Failure of the Coastal Drive would result in the loss of a driving opportunity, but would result in an additional trail. Visitors would lose some recreational opportunities, mainly fishing and wildlife viewing, if artificial impoundments were removed.

Newton B. Drury Scenic Parkway would continue as a through road, allowing some local casual and commuter traffic to mix with park-specific traffic, making the road more congested and less parklike than if the road was closed to through traffic.

Orientation, Information, and Interpretation

Visitors would receive better orientation services as interpretive waysides, directional signs, bulletin boards, and orientation kiosks were upgraded. Visitors' understanding and appreciation of the parks' natural and cultural resources would be improved as facilities were upgraded to provide more interpretation.

A new primary visitor center, if built, would provide visitors with opportunities to learn about the parks' significant resources and related primary interpretive themes at a much more comprehensive level than the introductory information currently available at the parks' visitor facilities. The use of a variety of interpretive media would lessen visitors' dependence on direct interaction with trained interpretive staff to provide in-depth interpretation and would accommodate the different learning styles

and preferences of individual visitors. The location outside the parks might not provide the kind of direct connection between the interpretive messages and the resources being interpreted that a site inside the parks would provide.

Visitors would benefit from additional interpretation of sensitive resource sites through publications and interpretive programs. The improvements in interpretive opportunities in the Bald Hills area would increase visitors' awareness and appreciation for cultural and natural resources there. Expanding the use of the outdoor schools to allow use by community and education groups in the summer and winter would increase the educational opportunities in the parks. Expansion of the education program would allow the program to benefit more students.

Conclusions

Visitors would have a limited number of additional recreational opportunities, and their ability to use and enjoy and experience RNSP resources would be slightly enhanced. Visitors would receive more orientation and interpretive information than at present. Opportunities for camping and trail activities would expand.

Cumulative Impacts

This alternative would have a small positive impact on visitor use and a moderate positive impact on orientation and interpretation.

SOCIOECONOMIC IMPACTS

Readers may want to refer to the "Socio-economic Impacts" section of alternative 1 and/or the glossary where some of the terms used in the following section are defined.

Visitor Use Impacts

The limited improvements envisioned under the no-action alternative would not be expected to attract substantial numbers of new visitors to Redwood National and State Parks beyond historical levels and growth rates indicated by NPS and CDPR visitation reports. The historical growth trend for RNSP visitation discussed in the "Affected Environment" section provides the basis for projecting RNSP visitors under the no-action alternative. The long-run trend line implied an average annual rate of growth (AARG) of 2.5% during the period 1970–96 in regard to the NPS visitation data and an average annual rate of growth of 1.8% during 1990–96 with respect to CDPR overnight camping visitors. Extending the trend line and growth rates through the year 2016 (the study time horizon), it is possible to forecast the number of park visitors during the next 20 years under the no-action alternative. This is done in five-year intervals in the following table:

TABLE 27: PROJECTED VISITOR USE, ALTERNATIVE 2

Year	RNSP-Related Visits NPS Data^a	Camping Visitors CDPR Data^b	Total Visits
2001	543,072	158,529	701,601
2006	614,432	173,319	787,751
2011	695,168	189,490	884,658
2016	786,513	207,169	993,682

a. Based on 480,000 visitors in 1996 and future growth of 2.5% per year.

b. Based on 145,000 visitors in 1996 and future growth of 1.8% per year.

Regional Economic Impacts

The no-action alternative would have a moderate beneficial impact on employment, earnings, and output. The tourism sector would experience healthy long-term growth, following historical patterns. Visitor interest would continue to be concentrated on the highway corridors, information centers, Lady Bird Johnson Grove, Redwood Creek, and roadside campgrounds (mostly in the state parks), as well as RV camping at Freshwater Spit.

For the no-action alternative and each of the action alternatives an analysis was made of economic impacts on the region. The details of these analyses are provided in a separate paper entitled “RNSP — Regional Economic Impact Analysis” (Hansen 1997). There would be relatively modest facility construction under the no-action alternative; however, trail and campground development would be extensive (four new campgrounds with 400 campsites and up to 160 miles of trails would be developed).

Construction activities under alternative 2 would have a total construction cost of \$26.2 million (in 1998 dollars). (Note that this figure exceeds the total in appendix D because it includes construction of the new GSA-built southern operations center.) Because these facilities would be funded from special authorizations, through Congress or the state, the parks’ budgets would not be affected and incremental changes in regional economic activity would be generated. Construction would generate about 426 direct and 824 total jobs with estimated direct and total earnings of \$11.1 million and \$22.7 million, respectively, in 1991 dollars. It is likely that a substantial portion of the jobs and earnings would go to local workers.

RNSP operations would be expected to increase from current levels by about 10 full-time equivalent (FTE) positions (including both NPS and CDPR staffing levels), and operating budgets would increase by about \$1.0 million per year. Visitor use at the parks would be expected to increase under the no-action alternative. The methods for estimating the regional economic impacts associated with RNSP operations and visitor activities were described in the “Socio-

economic Impacts” section for alternative 1 (the proposed action). Also, refer to the separate paper “RNSP – Regional Economic Impact Analysis” (Hansen 1997) for additional details.

There would be enhanced employment and income-generating opportunities associated with RNSP operations under alternative 2. With RNSP operations expenditures increasing modestly above current (FY 1996 levels), and RNSP-related annual visitation projected at 787,751 visitors in the year 2006, the associated direct and total (including indirect and induced components) employment would amount to 1,269 workers and 2,413 workers, respectively, due to RNSP purchases for personnel and other goods and services as well as visitor spending within the two-county region. (Direct and total employment associated with RNSP operations and visitor use during the 1996 base year amounted to 941 workers and 1,841 workers, respectively.)

Earnings associated with direct employment would amount to \$21.3 million; and total earnings would be \$56.7 million in 1991 dollars. These measures of economic activity would be associated with \$41.6 million in direct purchases and \$97.4 million in gross output within the region, also in 1991 dollars. It is necessary to recognize, however, that the additional regional economic activity associated with increased visitor use and associated expenditures beyond baseline levels is largely an artifact of expansion of recreation/tourism in general, not the result of specific measures undertaken by the National Park Service or California Department of Parks and Recreation under the no-action alternative. In effect, the increase in tourism is driven by national economic and demographic conditions and visitation trends.

Allowing commercial beach fishing to continue at Freshwater Spit, Gold Bluffs Beach, and Crescent Beach by permit only would result in no impacts on the affected population groups within the region.

Population and Housing Impacts

Most of the employment increases under the no-action alternative could be absorbed by the existing workforce. A few people might be induced to in-migrate to the area for work opportunities. There would be no adverse population and housing impacts on the region.

Public and Commercial Services Impacts

Most municipal services, utilities, and other facilities in Humboldt and Del Norte Counties (including the cities of Eureka, Arcata, Trinidad, and Crescent City as well as the McKinleyville, Orick, and Klamath communities) would be unaffected by implementing the no-action alternative. Transportation infrastructure would not be significantly affected, although traffic on Eureka and Crescent City streets and U.S. Highways 101 and 199 would be expected to increase moderately. There would be no adverse impacts on municipal services or fiscal conditions of local governments in the two-county area.

Enforcing existing regulations that restrict RV parking to a single row at Freshwater Spit might reduce the number of visitors staying overnight there and, consequently, lower the amount of purchases of goods and services in Orick. This would have a modest adverse effect on the fiscal condition of Humboldt County, the primary governmental jurisdiction for this area. Utility infrastructure would not be adversely impacted. Onsite infrastructure within the parks, such as water, sewer, roads, and parking, would be enhanced only modestly as funding from normal operating sources becomes available under the no-action alternative.

Services provided by the private sector, such as grocery stores, restaurants, hotels/motels, RV campgrounds, banks, etc., and used by visitors would likely accrue financial benefits from increased tourism generated by the parks. This might lead to increased private investment in facilities that serve tourists, particularly lodging, restaurants, and recreational services and retail

shopping. The Yurok Tribe and/or the private sector would possibly develop a lodge facility as part of its economic development strategy.

Land Use Impacts

There could be some changes in land use designation or zoning use classification due to RNSP land acquisitions for resource protection. Indirect impacts would include modest development of tourism-related infrastructure that could be accommodated under existing land use plans and zoning ordinances.

Impacts on American Indian Tribes

The NPS and CDPR staff would continue consultations with the Yurok Tribe and other American Indian tribes in the area as well as other agencies and cultural preservation interest groups related to issues of mutual concern. RNSP staff would support the private development of a destination lodge outside the parks, including a lodge as proposed for development by the Yurok Tribe. There would be no adverse impacts.

Conclusion

There would be moderate beneficial regional economic effects from increased spending on lodging, transportation, food, fuel, retail goods and services, etc. in the two-county impact area. There could be minor increases in population, and there would be no adverse effects on housing. Similarly, there would be minor adverse impacts on public services and some modest beneficial impacts on land use planning due to the participation of RNSP staff in gateway community planning decisions. There would be no adverse impacts on American Indian tribes in the area under the no-action alternative.

Cumulative Impacts

Please see the discussion of cumulative impacts in the “Socioeconomic Impacts” chapter of alternative 1.